



CENTRE DE RECHERCHE PUBLIC

ACTIVITY REPORT 2014  
CHANGE FOR PROGRESS



LUXEMBOURG  
INSTITUTE  
OF **HEALTH**  
RESEARCH DEDICATED TO LIFE





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# FOREWORD

## CHANGE FOR PROGRESS

*‘Progress is impossible without change, and those who cannot change their minds cannot change anything.’*

(George Bernard Shaw)

The year 2014 was a year of preparation for change. In October, the new law on public research was voted by Parliament. This law signed the end of CRP-Santé and the inception on 1<sup>st</sup> January, 2015 of the new Luxembourg Institute of Health (LIH), bringing together the assets and expertise of CRP-Santé and the Integrated BioBank of Luxembourg (IBBL). For this reason, the current report has to be considered as a bridge between our past and our future: although we shall still report the activities in 2014 of CRP-Santé, we are already experiencing daily the advantages of the new LIH organisation. In fact, much of the merger’s implementation had been planned and prepared during the last months of 2014.



*Dr Gregor Baertz, president of the new Board of Directors of the Luxembourg Institute of Health.*

CRP-Santé as an organisation has come to a very successful end: we have been able to meet and even to surpass most of our key performance indicators in 2014. Once again scientific excellence continued to improve, with an increasing number of scientific publications in high and very high impact factor journals (50 publications in journals with impact factor between 5 and 10 and among these 13 in journals with impact factor above 10). LIH has now clearly achieved visibility in the international scientific community, a prerequisite to attracting outstanding researchers to Luxembourg or to concluding collaborative deals with the pharmaceutical or biotechnology industries. This visibility also helps us to recruit and train the best PhD candidates: seven successfully obtained their PhD diploma in 2014.

We were able last year to extend our ISO 9001 certification to additional parts of the organisation and are looking forward to completing certification shortly.

Clinical research in collaboration with private industry, hospitals and clinical investigators is a main domain of activity of LIH. In 2014, we were able to include more than 1,100 participants in clinical trials, allowing them to benefit from the latest advances in medicine. We also extended our activities in public health and became an active member of several European networks, for instance on cancer registries. With an organisational restructuring of the department in early 2015, LIH has ambitions to provide further societal value to Luxembourg by developing its population health activities.

The current government has emphasised the importance of economic value creation from public research. Despite the limited presence of pharmaceutical or biotechnological industry in Luxembourg, LIH was able to sign 51 collaborative agreements with private industry in 2014. Seven of these contracts concerned wet-lab applications of LIH and resulted in almost half a million of external funding for LIH. In total, LIH attracted more than 10 million Euros of third party funding in 2014, which contributed significantly to paying the running costs of our organisation.



*Management board 2014 of the CRP-Santé. From left to right: Thomas Lentz (CFO), Prof Dr Simone Niclou (board member) and Dr Jean-Claude Schmit (CEO).*

Building on past assets, LIH is set to improve its performance in 2015. For this reason, LIH wishes to streamline its organisational structure by enhancing critical mass in our key research domains: cancer, infection & immunity and population health. The three thematic departments will be led by internationally renowned scientists, and will collaborate intensively with national partners such as the University of Luxembourg and with international players. In addition, the merger with IBBL enables LIH to propose a much broader offer of service to potential partners.

LIH has been closely involved since the beginning in the planning and evaluation of feasibility of a Luxembourg Medical School. Having a medical school in our country would bring multiple advantages to LIH and more specifically would foster the interactions between research and health care, thus creating new opportunities for value creation. It would also enhance the existing synergies between the University of Luxembourg and LIH. In expectation of a decision by the Government by end of 2015, LIH remains fully committed to the idea of a medical school and will actively contribute to the outline of the project.

Public resources have limits when it comes to financing research. LIH aims at raising increasing sums of private money to support its projects. In Luxembourg, we still do not have a tradition of private donations to projects of public interest, but we believe that we can convince private donors of the importance and the potential impact of our research on society.

In 2015, LIH will also tackle together with its supervising ministries two other hurdles to full performance: finding an appropriate building for its expanding research activities and putting in place a competitive remuneration system for researchers.

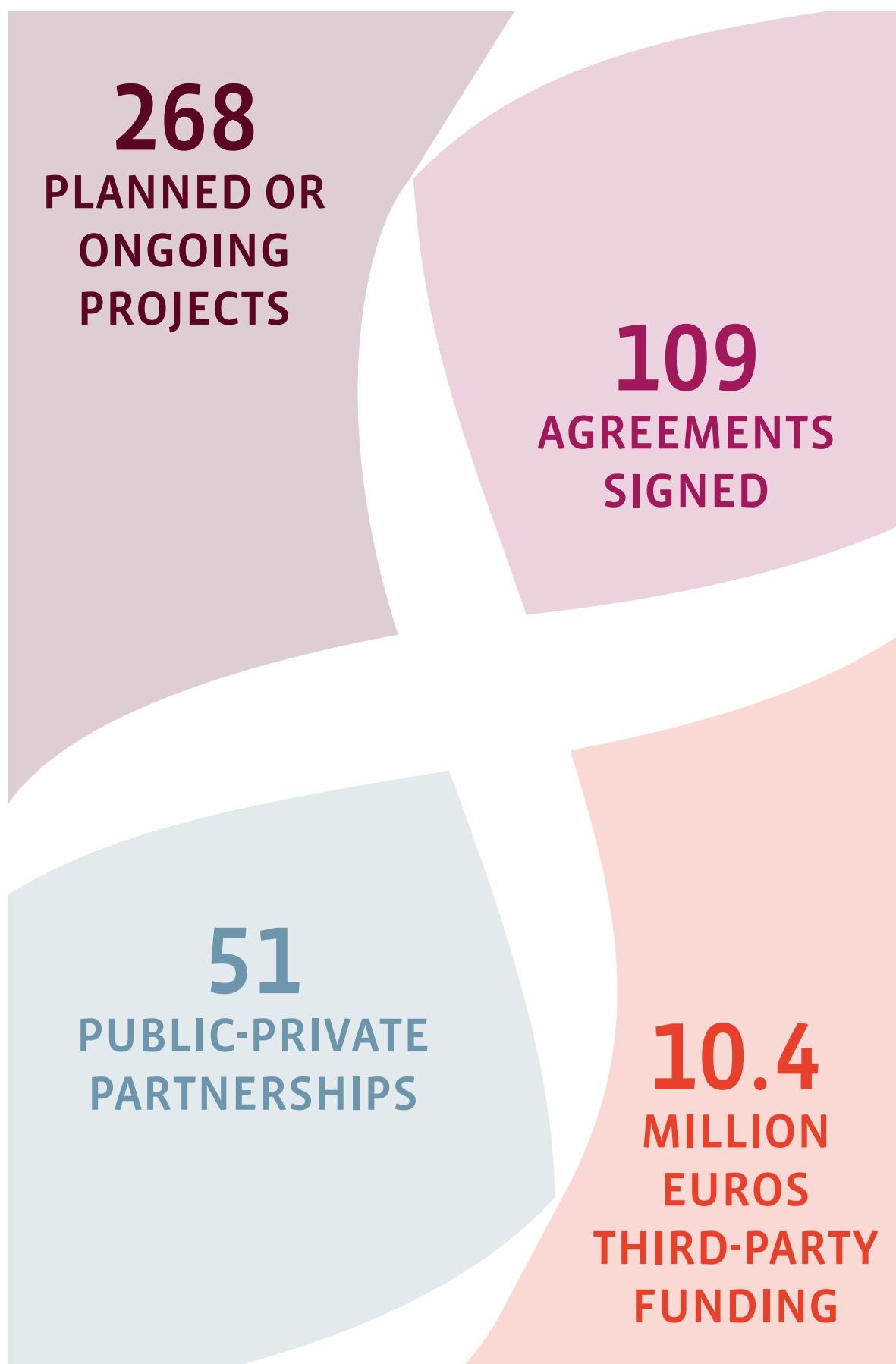
With a new law, a new governance and plenty of creative ideas for improvements, we are looking forward with confidence to the future development of the Luxembourg Institute of Health.

**Dr Jean-Claude SCHMIT**  
CEO

**Dr Gregor BAERTZ**  
President

## 2014 IN FIGURES







# TOWARDS SCIENTIFIC EXCELLENCE

Since 1989, CRP-Santé is meeting the challenge to excel in **biomedical and public health research** in Luxembourg and beyond the borders. The year 2014 was again rich in inspiring research activities and science-promoting events attracting numerous participants. The achievements of CRP-Santé's staff demonstrate the desire to create scientific and societal value, to improve health and to further increase the institute's visibility among the international scientific community and the general public.

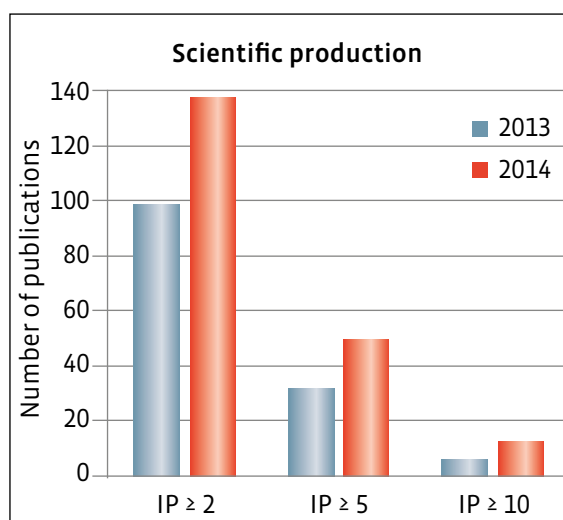
The past year was marked by the **progressive change** to the new identity of the organisation. The adoption of the name Luxembourg Institute of Health on 1<sup>st</sup> January 2015 and the incorporation of the Integrated BioBank of Luxembourg (IBBL) into the institution bring along a new corporate image, a reorganised departmental structure, novel research strategies and further opportunities for human and technological synergies. 2014 was thus a year of intense reflection and preparation.

CRP-Santé also engaged into a **new 4-year performance contract** (2014 - 2017) with the Government. In this first year, the institute almost fully met the criteria of the contract and even 'over-performed' in some points, for example in the publication of scientific findings.

Indeed, CRP-Santé surpassed its objectives regarding the intensity and quality of publication in international peer-reviewed journals with an impact factor above 2. The impact factor is an internationally recognised parameter reflecting the value of publications for the scientific community. In 2014, CRP-Santé's researchers authored **138 research and review articles** in journals with an impact factor greater than 2. These comprise all articles published in print or electronically during the year. Within this amount of articles, 37 appeared in journals with an impact factor between 5 and 10, and 13 were of very high standard being published in journals with an impact factor above 10.



Compared to 2013, there has been a remarkable and unprecedented **increase in scientific production** as illustrated by the figure on the side. Three outstanding publications from the past year, reflecting well the thematic diversity and scope of CRP-Santé's research, are highlighted in the next sections.



Scientific production at CRP-Santé in 2013 and 2014.  
IP = impact factor.



## IDENTIFICATION OF THE FIRST RABBIT ALLERGEN

The **Laboratory of Immunogenetics and Allergology** of the **Department of Infection and Immunity** identified and sequenced the first allergen specific for rabbit. The results were published in the *Journal of Allergy and Clinical Immunology* (Hilger et al., 2014), considered as the most relevant journal in the field of allergy research (impact factor 11.248).

Small animals such as guinea pigs, hamsters and rabbits are becoming more and more popular as domestic pets. They can however trigger allergic reactions in their owners. Until now, rabbit allergy was difficult to distinguish from other pet allergies as routine diagnosis is performed with animal hair or dander extracts. With this study, the researchers provide evidence for an **immunoglobulin E (IgE) antibody-reactive allergen specific to rabbit**, named Ory c 3. The allergen was detected at high concentrations in environmental samples such as settled dust from households with rabbit pets. Ory c 3, isolated from rabbit hair, is a lipophilin belonging to the secretoglobulin family. Modelling of its three-dimensional structure revealed a marked homology to Fel d 1, the major cat allergen. Interestingly, no IgE cross-reactivity was detected between both molecules. This study constitutes the first step towards a more specific diagnosis of allergy to rabbit.

The in-depth molecular characterisation of Ory c 3 is the result of an efficient teamwork led by Dr Christiane Hilger. It also involved a strong collaborative effort of the Laboratory of Retrovirology of the Department of Infection and Immunity for molecular modelling, the Department of Immunology for proteomics analysis as well as the National Unit of Immunology and Allergology and the Unit of Pneumology of the Centre Hospitalier de Luxembourg.



## LONG NON-CODING RNAs: NOVEL PLAYERS IN MYOCARDIAL INFARCTION

The team of the **Laboratory of Cardiovascular Research** from the **Department of Population Health**, headed by Dr Daniel Wagner and Dr Yvan Devaux, published a study (Vausort et al., 2014) in the renowned journal *Circulation Research* (impact factor 11.089) on the role of long non-coding ribonucleic acids in myocardial infarction.

Long non-coding ribonucleic acids, or shortly lncRNAs, constitute a novel class of RNAs that regulate gene expression. Although recent data suggest that lncRNAs are associated with cardiac disease, only few is known about their involvement in the setting of myocardial infarction (heart attack). In this study, 414 patients with acute myocardial infarction were enrolled to donate blood samples. The researchers found that the levels of lncRNAs in patients' cells were differentially expressed as compared to those from healthy controls.

The **regulation of lncRNAs** after myocardial infarction makes them good candidates for a possible use as biomarkers to predict the progression of heart dysfunction.



### UNRAVELLING METABOLIC CHANGES INDUCED BY BRAIN TUMOUR TREATMENT

Researchers from the **NorLux Neuro-Oncology Laboratory** of the **Department of Oncology** and the Norlux Neuro-Oncology Laboratory in Bergen, headed by Prof Dr Simone Niclou and Prof Dr Rolf Bjerkvig respectively, joint their forces to explore the metabolic changes observed in brain tumours after anti-angiogenic therapy. The study (*Fack et al., 2014*) appeared in the highly acclaimed journal *Acta Neuropathologica* (impact factor 9.777).

Anti-angiogenic therapy, which inhibits tumour vascularisation in glioblastoma, the most severe form of brain tumours, has not led to the desired improvement in patient prognosis. To understand the underlying resistance mechanisms, the team investigated how human glioblastoma adapt to the angiogenesis inhibitor bevacizumab at the metabolic level. For this, they performed a metabolic flux analysis comparing untreated and treated tumours.

With this study, the team could show for the first time that glioblastoma undergo **metabolic re-programming** during bevacizumab treatment associated with increased hypoxia (lack of oxygen) and glycolytic activity. The tumour cells did however not change their major characteristics, such as their ploidy level, tumour specific genetic aberrations and putative stem cell surface protein marker profile. The adaptation to bevacizumab treatment thus represents an adaptive metabolic response to therapy. The study suggests that therapeutic approaches targeting the adaptive tumour metabolism should be developed to achieve synergistic effects with anti-angiogenic treatment of tumours.

The group has, as one of the first worldwide, extended preclinical studies to metabolic flux studies in glioblastoma patients. The information from these studies may provide the basis for the development of new therapeutic strategies towards this severe brain cancer type.

# IMPROVING HEALTH IN LUXEMBOURG

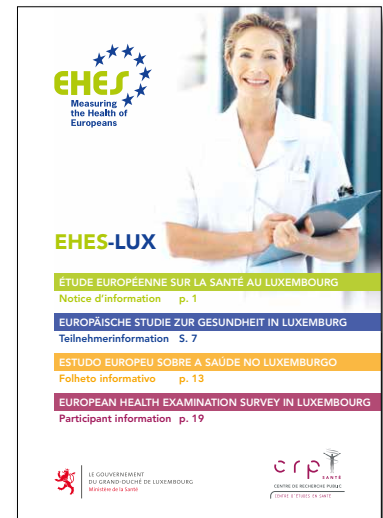
Increasing knowledge in research topics related to human diseases and finding new health solutions from which the society can benefit, have again been the major objectives of CRP-Santé in 2014. The institute was particularly active in recruiting participants from Luxembourg and its surroundings for large-scale health-related studies. A range of such studies were also completed the past year and reveal conclusive results that should lead to novel recommendations for the improvement of health and well-being.

## RECRUITMENT OF NUMEROUS PARTICIPANTS FOR EUROPEAN HEALTH SURVEYS

Throughout the last two years, the **Centre for Health Studies** of the **Department of Population Health** was heavily involved in the collection of epidemiological data for three major European health studies. The recruitment periods were closed end of December 2014 for all three. The centre has shown efficient coordination and teamwork during the recruitment phase and achieved a very large participation of the Luxembourgish population.

CRP-Santé was invited by the Ministry of Health to conduct a national health study in the context of the **European Health Interview Survey** (EHIS-Lux). Over a period of 10 months, from March to December 2014, 4,138 people aged at least 15, were recruited for the survey. The purpose of the study is to assess the proportion of the Luxembourgish population suffering from chronic diseases and to determine the relationship between disease, health risk factors and lifestyle. An anonymous questionnaire was used to collect data on well-being, health behaviour, lifestyle and the use of health care services.

For the **European Health Examination Survey** (EHES-Lux), another large epidemiological study, 1,533 participants aged between 25 and 64, volunteered to fill in a questionnaire and to undergo an overall health check, meaning a biological and clinical examination. The study was conducted during a total of 19 months and involved research nurses from the Centre for Health Studies and temporarily also from the **Clinical and Epidemiological Investigation Centre**. Marylène d'Incau, research nurse at the Centre for Health Studies, was the fieldwork coordinator. This study is aimed at the identification of key health indicators. The results will further be used to promote best practices and ways of life, namely through health awareness campaigns. Moreover, the EHES-Lux is a pilot phase of a future national cohort project.







*Team involved in EHIS-Lux and EHES-Lux. From left to right: Graziella Ambroset, Melanie Kiemen, Audrey Billy, Christine Gauthier, Agnès Columbeau, Jean-Yves Ferrand, Marylène d'Incau, Jessica Barré, Dominique Mormont, Julien Jacobs, Jessica Pastore and Joël Weis.*

The third study **Health Behaviour in School-aged Children** (HBSC) of the World Health Organisation in Europe (WHO/Europe) is conducted jointly with the Ministry of Health and the Ministry of Education, Childhood and Youth. Project leader is Dritan Bejko from the Centre for Health Studies. The study aims at getting a better overview on the well-being of young people, their health behaviour as well as the social context in which they grow up. This study, for which the recruitment was conducted in schools, had the largest participation with 7,757 young people aged between 11 and 17.

The next step after the recruitment process will be the cleaning, analysis and interpretation of the collected data. The results of these three major surveys should lead to national and international reports and significant scientific publications.



**hbsc**  
BEHAVIOUR IN  
SCHOOL-AGED CHILDREN

## NUTRITIONAL STUDIES: UNBALANCED DIETARY HABITS ARE SERIOUS RISK FACTORS TO HEALTH

Three studies from the **Centre for Health Studies** of the **Department of Population Health** indicate a strong influence of our dietary habits, namely the disproportionate intake of certain types of aliments or the consumption of ready-made food, on the risk of developing chronic diseases such as obesity, diabetes or cardiovascular disorders.

The three publications, first-authored by Dr Ala'a Alkerwi, appeared in two prominent international journals on nutrition-related research: the British Journal of Nutrition and the Public Health Nutrition Journal. The projects leading to these publications were financed by the Luxembourg National Research Fund and include collaborative work with nutritional researchers from the University of Liège (Belgium), the University of South Carolina (Columbia, USA) and the University of South Australia (Adelaide, Australia). The nutritional studies were conducted using data from the first nationwide ORISCAV-LUX survey (Observation of Cardiovascular Risk Factors in Luxembourg) carried out in 2007/2008 with more than 1,400 healthy adults living in Luxembourg.

One of the publications of Dr Ala'a Alkerwi and co-workers reports a link between the consumption of **ready-made meals** and **abdominal obesity**. In our modern speeded-up society, people most often lack time to prepare meals on their own. They tend to consume more and more ready-made meals, sold in pre-packaged portions in supermarkets or fast-food stores. Compared to the consumption of self-prepared food, eating ready-made meals means a higher energy intake and a poor compliance with nutritional guidelines. This study is one of the very first worldwide focussing on the health effect of ready-prepared meals, as most related studies were conducted on food served in fast food restaurants. It reveals that regular



*Dr Ala'a Alkerwi, senior researcher in the field of nutrition and nutrition-related health risks.*

intake of ready-made meals greatly affects fat deposition and thus favours abdominal obesity.

A second publication evaluates five commonly used **indicators for nutrition quality** against biomarkers of chronic diseases. This study concludes that the best score to predict health outcomes is the Mediterranean Diet Score. Most importantly, it indicates that a Mediterranean diet, characterised by a regular consumption of olive oil and nuts and a modest consumption of meat, reduces the risk of cardiovascular diseases. Hence, this diet type has the potential to serve as universal nutritional guideline.

In the third study, the health impact of the **consumption of different types of animal proteins** (egg, fish, shellfish, meat, dairy products) was analysed. The proteins humans consume have different nutritional values when coming from different origins. The study shows that an important intake of proteins from meat, fish and shellfish is associated with abdominal obesity and with global obesity. For the protein derived from eggs or milk products, no correlation with obesity could be shown. Overall, the results suggest that other sources of protein than meat should be preferred to maintain body weight.

The findings of these three nutritional studies point to the need to increase the population's knowledge with regards to national recommendations for food and nutrient intake by means of awareness campaigns.





*Press conference on domestic violence. From left to right: Dr Jean-Claude Schmit (CEO), Lydia Mutsch (Minister for Equal Opportunities) and Dr Laurence Fond-Harmant (project leader of the study).*

## DOMESTIC VIOLENCE: INVESTIGATE THE CAUSES FOR A TARGETED PREVENTION

CRP-Santé was mandated by the Ministry of Equal Opportunities to carry out a scientific study on domestic violence in Luxembourg. The project purposed to assess the origins and causes of domestic violence within families. Based on the study results, it further aimed to establish national recommendations on prevention, protection of the victims and support for the perpetrators.

Domestic violence can have dramatic consequences on the victims' physical and mental health. The World Health Organisation hence considers domestic violence, which affects mostly women but also men and

children, as an important **public health issue**. In Luxembourg, the Ministry of Equal Opportunities made the prevention and handling of cases of domestic violence one of its priorities. An essential step was the coming into force in 2003 of a law defining a first framework to deal with declared cases.

The study, led by Dr Laurence Fond-Harmant from the **Centre for Health Studies** of the **Department of Population Health** from December 2012 to December 2014, intended to get a better overview on the current situation regarding domestic violence. The following questions were addressed: Who are the victims



and perpetrators of domestic violence? In which social and cultural environment do they live and what are their characteristics? Were or are they currently exposed to violence at their home or within their community? What are the main risk factors leading to the emergence of domestic violence?

The study involved three groups of individuals: victims, perpetrators and professionals of the field. It was structured into two stages, preceded by an intense literature search and an examination of existing statistics from the last 10 years. In a first quantitative approach, victims and perpetrators filled in anonymous questionnaires assessing their life situation and their personal experience with violence. From more than 3,500 questionnaires distributed in partner structures, 144 of those sent in by victims and 39 of those returned by perpetrators were included into the study and analysed in detail. The second stage was a qualitative approach consisting of semi-structured individual interviews with a sample of victims and perpetrators.

The survey allowed getting a valuable insight into the diversity of violence contexts. Several **risk factors** associated with the occurrence of domestic violence were identified: demographic, cultural, educational and economic background, physical and mental health, previous exposure to violence as well as family history.

The project is a successful collaboration between many partners active in the field: police, court, associations and social structures. In addition, 20 experts from Luxembourg and abroad contributed to the project's success by giving their professional view. At the end of the study, a number of recommendations were established on how to better prevent domestic violence and support the people concerned. Their implementation will further be discussed with all parties.

#### NATIONAL CANCER REGISTRY: MONITORING CANCER EVOLUTION



Substantial progress has been made in the past year on the set-up of the National Cancer Registry, launched in May 2013. Its purpose is to obtain transparent and **standardised patient data** to reliably follow cancer incidence, treatment, follow-up and patient survival in Luxembourg. Further goals are to better assess the quality of health care provided to cancer patients as well as to promote prevention campaigns and cancer screening. In the long-term, the registry will serve as a tool to evaluate whether the National Cancer Plan 2014 - 2018 can attain its objectives.

CRP-Santé developed a secured module for the export of encrypted patient data from hospital-based cancer registries. This module was used to transfer data on breast cancer from all the hospitals in Luxembourg to the registry. The team at the **Centre for Health Studies** of the **Department of Population Health** prepared a quality control of the collected data and calculated different indicators for breast cancer, which were subsequently communicated to the hospital directions.

Moreover, the team was engaged in providing initial and further training to data entry operators working at the hospitals (Data Managers Cancer). The courses taught how to codify and introduce data from patient files into a hospital-based cancer registry.

In the first year, only data from solid cancers (breast, colon, lung and prostate cancer) were collected. In 2014, data assembling was extended also to haematological malignancies such as lymphoma and leukaemia.



#### LAUNCH OF THE EPIPATH STUDY: LINKING CHILDHOOD ADVERSITY TO ADULT DISEASE

Severe early life adversity, such as adoption, parental divorce, or sickness, is thought to be one of the strongest risk factors for three major types of diseases in adulthood: cardiovascular disorders, upper respiratory tract infections and mental health problems. These disease groups have been linked to changes in the body's stress response which could cause amongst others long-lasting epigenetic changes. Adverse experiences may lead to **high-risk epigenetic modifications** enhancing the likelihood of getting disease.

This hypothesis is addressed in the clinical study EpiPath, carried out by a project team led by Dr Jonathan Turner and Prof Dr Claude Muller at the **Department of Immunology**, in collaboration with the Universities of Luxembourg and Trier. The study is supported by the Luxembourg National Research Fund. In March 2014, the recruitment of 250 participants aged between 18 and 35 was launched. Participants are invited to two visits consisting of physiological tests and a psychological interview. Additionally, their health status is being recorded over one year through a monthly online health survey.

Epigenetic marks identified in this project could have a prognostic and diagnostic value in the future, as biomarkers of childhood adversity and as risk factors for later-life diseases.

## RECRUITING 1,000 RUNNERS FOR TWO UNPRECEDENTED STUDIES ON RUNNING-RELATED INJURIES

The **Sports Medicine Research Laboratory** at the **Department of Population Health**, which focuses its research on new solutions for prevention and therapy of sports-related injuries, launched two new challenging projects involving the participation of the impressive number of 1,000 recreational runners.

For the first study, initiated in March 2014, 423 long-distance runners were recruited and received a specific type of running shoes to be used for regular running during six months. The project goal is to investigate the effect of an integrated **motion control system** (anti-pronation) in the shoe on the risk of running-related injuries.

For the second study, started in September 2014, 577 novice and experienced recreational runners were recruited by a widely communicated call for participation. Here, participants were also enrolled for a period of six months. This project intends to determine the impact of the **heal-toe height difference** (drop) of running shoes on the risk of getting injured during running.

To track the running activities and the incidence of injury, participants of both studies use the online platform TIPPS (Training and Injury Prevention Platform for Sports, [www.tipps.lu](http://www.tipps.lu)) which functions as an electronic agenda for training data. Additionally, a sub-group of participants were invited to participate in a biomechanical analysis of their running technics at the laboratory.

The results of these studies will help the runners to select the running shoes which are the most effective in preventing running-related injuries and will also provide the shoe manufacturers with evidence for the development of more protective shoes.



# CONTINUITY AND DEVELOPMENT

CRP-Santé's scientific staff and its administrative and research-support services build on both continuity and development. In 2014, efforts made in the improvement of the human resources policies lead to a distinction and the quality management system received particularly positive reports from external audits. On the research level, the institute strived to progress and to enhance its international visibility. The appointment of a new head for one of its departments is a development that will undeniably foster new collaborations and lead to the maturation of novel research strategies. More detail on these highpoints of the year can be found below.

## MAINTENANCE OF THE LABEL 'HUMAN RESOURCES EXCELLENCE IN RESEARCH'

CRP-Santé attained the fifth and final step of the setting-up of improved human resources policies in accordance with the **European Charter for Researchers** and the **Code of Conduct for the Recruitment of Researchers**. Accordingly, the institute successfully maintains its label 'Human Resources Excellence in Research' obtained in 2010 by the European Commission.



### HR EXCELLENCE IN RESEARCH

CRP-Santé was the first Luxembourgish research institution to hold the 'Human Resources Excellence in Research' label and also the first to pass all required steps for its long-term maintenance. To achieve this stage, the Human Resources Unit, headed by

Natacha Beicht-Claude, implemented a range of concrete actions. It started in 2009 with a gap analysis to compare the initial procedures with the requirements of the charter and the code of conduct. Further, a **detailed action plan** was developed and published in 2010 and subsequently followed over several years. A final audit with external auditors in July 2014 led to the positive decision to maintain the label.

The application of the action plan resulted in important measures from which the institute's staff can benefit, for instance, the establishment of transparent recruitment procedures, the organisation of yearly internal trainings for young researchers or the opportunity for employees in leading positions to attend management courses.

## RENEWAL OF ISO 9001-2008 CERTIFICATION FOR SIX UNITS

Following audits of the European Society for Certification of Management Systems in October 2014, CRP-Santé successfully managed to renew its ISO 9001-2008 certification for six of its units (laboratories and administrative services) initially certified in 2013. In addition, the institute extended the scope of certification to its pathogen-free animal facility for rodents.

The auditors noted the **efficient quality management system** entirely meeting the requirements of the ISO standard. They especially complimented on the numerous improving measures that have been undertaken within one year to allow the quality management, headed by Blandine Valet, to be more responsive to changes in the institute's activities. These measures include for example the development of new IT tools and the integration of health and safety into the quality system.

## APPOINTMENT OF PROF DR MARKUS OLLERT: DEVELOPING THE DEPARTMENT OF INFECTION AND IMMUNITY

CRP-Santé continued to develop its **Department of Infection and Immunity** with the engagement of Prof Dr Markus Ollert as a department director on 1<sup>st</sup> September 2014. Prof Dr Ollert obtained his medical degree from the Ludwig-Maximilians-Universität in Munich in 1987 and worked amongst others for 18 years in the renowned Department of Dermatology and Allergy at the Technical University of Munich. With this long-lasting professional experience, he acquired exceptional proficiency as a researcher, laboratory head, university professor and chief physician.

Using his well-proven management skills and his visionary thinking, Prof Dr Ollert will drive the department forward. As first assignment, he sees the creation of a **true departmental identity** connecting the two units composing the department: the **Laboratory of Retrovirology** and the **Laboratory of Immunogenetics and Allergology**. Common department seminars have already been initiated. Prof Dr Ollert is very closely involved in the research activities of his department on a daily basis and considers the support in career development of young scientists as an essential part of his function.

Another priority is the establishment of research collaborations. Prof Dr Ollert started fostering contacts on a local and international level. Hence, it is planned that his department will reinforce its link with the Centre Hospitalier de Luxembourg. Moreover, common projects with the University of Southern Denmark in the field of allergy research are foreseen.



*Prof Dr Markus Ollert, new director of department.*

Prof Dr Ollert also wants to make use of his experience in technology transfer at the CRP-Santé. He is co-inventor on numerous patents with the Technical University of Munich and the University of Hamburg and cofounder of the spin-off Protein-Ligand-Structural Design GmbH (PLS-Design) located in Hamburg and specialised on the development of innovative immunotherapeutical solutions.

With these objectives, he hopes to substantially contribute to Luxembourg's performance and international visibility in biomedical research in the future. Indeed, the reinforcement of the country's expertise in research on allergies, autoimmune disorders and infectious diseases could lead to the **development of efficient immunotherapies** and be beneficial for many other related research domains such as in oncology or in neurodegeneration.



# TECHNOLOGY AND KNOWLEDGE TRANSFER

Novel research findings, technological development and specialist knowledge should not only be reserved to a small community of scientific experts but have a true societal and economic benefit. CRP-Santé thus focused on further valorising its activities for society. Two examples are presented below.

## COMMERCIAL LICENSING AGREEMENT FOR THE BIOINFORMATICS TOOL COMET



Daniel Struck

In March 2014, the **Laboratory of Retrovirology** of the **Department of Infection and Immunity** entered into an exclusive worldwide licensing agreement with the company **Advanced Biological Laboratories SA** (ABL), a spin-off of CRP-Santé founded in 2000, for the COMET (COntext-based Modelling for Expeditious Typing) software. COMET is a bioinformatics tool designed to rapidly analyse and optimally subtype large genetic data sets arising from epidemiological or antiretroviral resistance studies on the human immunodeficiency virus (HIV) and hepatitis C virus (HCV).

COMET is able to analyse accurately up to 1,000 HIV-1 protease and reverse transcriptase sequences per second. It is by far the fastest tool available for the classification of viral sequences from HIV-1/2 and HCV into subtypes or genotypes. COMET is also capable of detecting if a sequence is a recombinant. The software is regularly updated with newly identified subtypes and circulating recombinant forms.

The achievement of a licensing agreement is the result of a **successful public-private partnership** in which bioinformatician Daniel Struck, who developed the software, was intensively involved. ABL now promotes COMET alone or embedded within its software applications. Integrated in the clinical management and diagnostics platforms of ABL, COMET can contribute to support the decision-making of health care professionals in their daily challenge of providing the best treatment adapted to each of their patients with respect to viral and other infectious or chronic diseases.



## INTERNATIONAL ENGAGEMENT OF CRP-SANTÉ'S EXPERTS IN METHODOLOGY AND STATISTICS

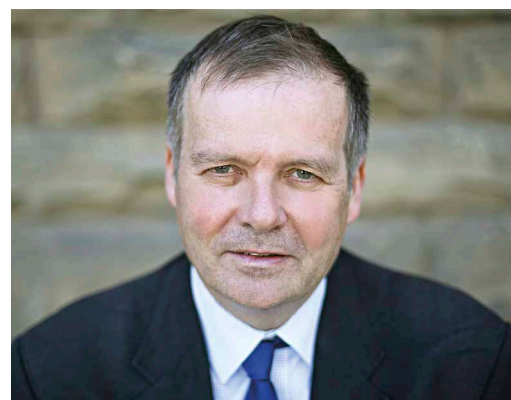
The expert team for **Methodology and Statistics** provides professional consulting support for the researchers of the institute, but not only. It has many other missions with a prominent international dimension and is particularly active in working with large public organisations and pharmaceutical companies.

The consultancy activity for external organisms represents about 15% of the team's workload. In 2014, it has provided its know-how for the planning of **clinical studies** to eleven pharmaceutical companies and one big hospital, located in seven different countries. In addition, the head of the team Prof Dr Stephen Senn and researcher Dr Michel Vaillant are members of various Data and Safety Monitoring Boards as well as Data Release Boards.

On behalf of a special programme of the World Health Organisation (WHO), Dr Michel Vaillant has been involved since 2011 as project leader in the data management and statistical analysis of three clinical studies for the treatment of poverty-related infectious diseases: the Moxidectin study for river blindness (onchocerciasis), the Gatifloxacin study for pulmonary tuberculosis and the NECT study for sleeping sickness (Human African Trypanosomiasis). Results from the Gatifloxacin study came out in October 2014 (*Merle et al., 2014*).

Researcher Dr Olivier Collignon has been seconded in 2014 for one year to the European Medicines Agency in London, which is responsible for the scientific evaluation of medicines for use in the European Union. His mission is to provide **statistical support** in the evaluation of new drugs tested in clinical trials and to give scientific advice on trial design. One of the values of the secondment is to increase the competence of CRP-Santé's staff in regards to drug regulation in the European Union and to extend the team's network of experts.

The Methodology and Statistics service is also part of the WHO capacity building program. It transfers its knowledge to scientists from Africa and Asia in data management and other subjects, either by hosting them in the team or by offering on-site training.



*Prof Dr Stephen Senn*

## COLLABORATION HIGHLIGHTS

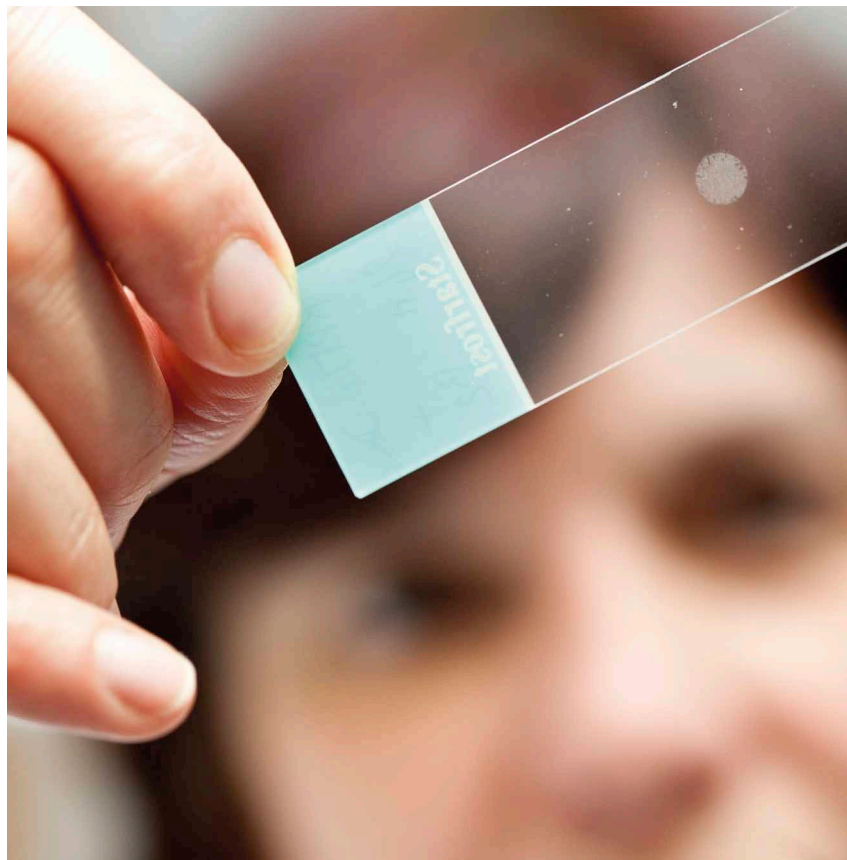
Scientific quality and know-how is a must to get involved in scientific collaborations at national, European and global levels. CRP-Santé is the initiator of numerous solid partnerships and is also often invited to contribute to external research projects as partner.

### LUNG CANCER TREATMENT: PARTICIPATION IN AN INTERNATIONAL CLINICAL STUDY

The close collaboration of the **Clinical and Epidemiological Investigation Centre** of the **Department of Population Health** and the Centre Hospitalier de Luxembourg is an excellent example of a fruitful joint national project within the context of a large international clinical study. The results of the study examining lung cancer treatment were published in December 2014 in the New England Journal of Medicine (*Solomon et al., 2014*), one of the most influential medical journals (impact factor 54.420).

At the Centre Hospitalier, principal clinical investigator Dr Guy Berchem (also head of CRP-Santé's Laboratory of Experimental Haemato-Oncology, Department of Oncology) and clinical co-investigator Dr Martina Degeorgis led the project. At CRP-Santé, Dr Anna Chioti, head of the Clinical and Epidemiological Investigation Centre, and Myriam Alexandre, Senior Clinical Research Associate, were intensively involved. The centre's role within this and other clinical trials is to support the organisation and logistics and to ensure that international standards are respected.

Around 3 to 5% of lung cancer patients present an acquired mutation in the *ALK* gene (Anaplastic Lymphoma Kinase) generated by gene rearrangement. In this study, the **drug crizotinib**, targeting the aberrant *ALK* protein, was tested as first line treatment on previously non-treated *ALK*-positive patients suffering from a form of lung cancer named non-small-cell lung carcinoma. The study was conducted



under the supervision of the European Medicines Agency for over two years and with 343 participants from about 170 research centres worldwide.

The study demonstrates that the use of crizotinib is significantly more efficient than treatment with chemotherapeutic agents, classically used as first line treatment. Until now, crizotinib has only been prescribed as second line treatment. Arising from the results of this study, therapy recommendations will be readapted soon.

Luxembourg contributed with **two lung cancer patients** having the rare *ALK* mutation. Thanks to the study, both participants, who were in an advanced disease stage and had already developed metastases in the brain, could benefit from an efficient treatment that rendered them tumour-free and considerably improved their life expectancy and quality.

## EXPOSURE TO POLLUTANTS: STUDY WITH CHILDREN'S HAIR SAMPLES FROM FRANCE

The French newspaper 'Journal du Dimanche' initiated and sponsored a scientific study on the exposure of children to pollution using hair samples as biomonitoring matrix. Dr Brice Appenzeller and his team from the **Laboratory of Analytical Human Biomonitoring** of the **Department of Population Health** have a unique expertise in the analysis of hair strands. This is why the laboratory was designated to carry out and interpret the analytical experiments for this important study. The newspaper published the meaningful results in November 2014.

28 children from Paris and 10 from île d'Yeu, an island next to the Vendée coast, aged between 2 and 11, provided a hair sample to be analysed for the presence of different types of pollutants. Compared to blood or urine samples, hair samples allow to trace exposure to pollutants over a longer period of time. Indeed, 1 cm of hair contains the information on 1 month of exposure. The two collection sites, Paris and île d'Yeu, were chosen to make a comparison between individuals from an urban area with high air pollution from cars and industry and individuals living in an area which is more spared from those pollution sources.

Dr Appenzeller's group developed an efficient method to **extract pollution markers**, reliably reflecting the level of exposure, from the internal structure of the hair. Those markers are metabolites of polycyclic aromatic hydrocarbons (PAHs), such as naphthalene, fluorene, phenanthrene and pyrene. Some PAHs are classified as carcinogenic, but their effects on human health remain largely unknown. They are released into the air during combustions and hence originate for example from industrial production or waste treatment.

Being volatile, they are mostly inhaled but can also be ingested, for example with grilled meat, eggs or dairy products.

The pollution markers were quantified using liquid chromatography coupled to mass spectrometry. Major findings resulted from the study: From **50 measured substances**, 10 were found to be present in all the hair samples. For those, the average concentrations were about twice as high in the samples from Paris as compared to the control samples and even up to 9 times higher than the median for the most exposed children.

The study also showed that children of low age are more exposed to PAHs in both populations. A possible explanation could be the frequent hand-to-mouth contact in young children, favouring ingestion of pollutants. Another interesting result is the big variation in the concentration of different PAHs from one child to another, showing that children are exposed to different pollution sources and that the pollution cocktail in the air is not homogenous.

The study also included the measurement of cotinine, a biomarker of exposure to cigarette smoke. Strikingly, all Parisian children were detected as being **passive smokers**, independently of whether their parents smoke or not. Their cotinine levels were 5 times higher than those from the control population. This can be explained by the high population density in Paris making the contact with cigarette smoke more frequent.

Bigger epidemiological studies with randomised participants will be necessary to confirm these results on urban pollution and expand them also to other cities or regions.

## CARDIOLINC - A REASEARCH NETWORK ON CARDIAC LONG NON-CODING RNAS



The prime example of a multinational cooperation driven by CRP-Santé is the creation of the Cardiolinc network. Initiated and coordinated by Dr Yvan Devaux, Associate Head of the **Laboratory of Cardiovascular Research** at the **Department of Population Health**, Cardiolinc connects researchers interested in deciphering the role of long non-coding ribonucleic acids (lncRNAs) in cardiac disease with the perspective to improve health care for patients.

The collaboration, which began with five partners, was expanded in 2014 to a consortium of 19 member institutions and 2 industrial partners from 8 European countries and the United States. A website serving as an **exchange platform** ([www.cardiolinc.org](http://www.cardiolinc.org)) was launched on 2<sup>nd</sup> December 2014. It was jointly designed and built by the IT unit, the communication service and the staff of the Laboratory of Cardiovascular Research. The website allows the members to share knowledge, ideas and discoveries. It informs about relevant publications, international calls for proposals, multicentre research projects, interesting job opportunities as well as news and events in cardiovascular research. It also serves as a contact point for researchers who would like to join the community.

The Cardiolinc network met on 10<sup>th</sup> December 2014 in Luxembourg for a kick-off meeting and discussed on this occasion about the submission of joint applications for international grants. The creation of this network will undoubtedly further stimulate the research on the role of lncRNAs, which are believed, like microRNAs, to constitute a reservoir of tools to develop treatments against cardiovascular diseases. With its central role as **network coordinator**, the Laboratory of Cardiovascular Research also hopes to contribute to the enhancement of the scientific reputation of CRP-Santé.



# EDUCATION AND FURTHER TRAINING

CRP-Santé hosts more than 50 trainees, Master students and PhD candidates, affiliated to the University of Luxembourg or to foreign partner universities such as the Universities of Strasbourg, Liège and Trier. It also offers an excellent work environment for postdoctoral scientists who specialise themselves in a given research domain. The institute aims at providing high-quality training for its young researchers to give them the best chances for their future career.

## TRAINING FOR EARLY-STAGE RESEARCHERS

For two years already, CRP-Santé organises the **Training & Workshops** series especially meant for young researchers. These courses, held by dedicated internal staff, allow the next generation scientists to enhance their transversal skills in order to facilitate their current work and to prepare for the next career step. They are also open to external researchers from the other Luxembourgish public research institutions and already enjoy popularity. The offer comprises amongst others trainings in publication writing, oral presentation, peer-reviewing and intermediate statistics.

In 2014, the course programme was extended. The Technology Transfer Office held two new trainings on **intellectual property**, intended for all researchers of the institute, including the laboratory heads. The two courses had 39 attendants in total and received a particularly positive feedback. Their reiteration is planned for the coming Training & Workshops series, which will additionally comprise new courses on specific scientific techniques like microscopy, mass spectrometry and flow cytometry.

## OUTSTANDING PHD THESES

In 2014, seven PhD candidates successfully graduated. The three most outstanding are shortly presented below.

- **Emeline Goretti** - Circulating microRNAs as biomarkers and therapeutic targets for cardiovascular disease.

Emeline Goretti from the **Laboratory of Cardiovascular Research** of the **Department of Population Health** defended her PhD thesis with highest honours at the University of Lorraine (France). She had twelve publications (research articles, reviews, book chapters), among these six as first author. This is an extraordinary achievement from a 4-year PhD thesis. Her work was part of a CORE project financed by the Luxembourg National Research Fund. She is now setting up her own project in cardiovascular research for a grant proposal.

- **Olivier Keunen** - Multimodal imaging of physiological changes induced by anti-angiogenic therapy in glioblastoma.

Olivier Keunen from the **NorLux Neuro-Oncology Laboratory** of the **Department of Oncology** defended his PhD thesis at the University of Bergen (Norway), a longstanding partner of the laboratory. His outstanding work led to six publications. Oliver Keunen, who took an unusual career path by switching from informatics to biomedical research, demonstrated his ability to carry out multidisciplinary work and developed into an excellent researcher. He will at present be responsible for the new *in vivo* imaging platform at the institute.



- **Iris Andernach** - Characterisation and evolution of hepatitis B virus genotypes.

Iris Andernach from the **Department of Immunology** received her PhD degree with *magna cum laude* from the University of Saarland/Homburg (Germany). Her PhD was funded by a fellowship of the Luxembourg National Research Fund. PhD candidates at the Department of Immunology usually have a good number of publications, often up to five, during their doctorate. Iris Andernach outperformed with seven publications, five of them as first author. Iris works now at the renowned Robert Koch Institute in Berlin at the Biosafety Control in Developing Countries Unit.



PhD defence at the University of Saarland. From left to right: Prof Dr Nikolaus Müller-Lantsch (University of Saarland), Prof Dr Claude Muller (PhD supervisor, Department of Immunology), Iris Andernach, Prof Dr Friedrich Grässer (University of Saarland).



## CONNECTING YOUNG RESEARCHERS: LIFE SCIENCES PHD DAYS

The fourth edition of the yearly Life Sciences PhD Days of the University of Luxembourg took place on 15<sup>th</sup> and 16<sup>th</sup> September 2014 at Centre Hospitalier de Luxembourg and was co-organised this time by **six PhD candidates of CRP-Santé**. With around 100 participants, a great number of excellent scientific presentations and many opportunities for networking, this event was a full success.

Three internationally renowned keynote speakers were invited and 22 PhD candidates were given the opportunity to present their research projects and newest findings in an oral presentation of 15 or 30 minutes. Additionally, over 30 posters were presented during two poster sessions. The communications covered a large variety of topics in research areas such as infectious

diseases, cardiovascular and neurological disorders, cancer, sports-related injury or the human gut microbiome.

A **price of 2000 euros** was awarded to four young researchers, amongst them Anne Dirkse from the NorLux Neuro-Oncology Laboratory of the Department of Oncology for having presented one of the best posters. The event was also an occasion for more than 25 newly hired PhD candidates to shortly introduce themselves and their research project to the audience with a one-slide presentation.

The organisation of the Life Sciences PhD Days was financially supported by CRP-Santé, the University of Luxembourg, the Luxembourg National Research Fund and industrial sponsors.



*Life Sciences PhD Days: Oral presentations of PhD projects.*

## 6<sup>th</sup> CLINICAL RESEARCH DAY: TRAINING ON PHARMACOVIGILANCE



*6<sup>th</sup> Clinical Research Day: Presentation of Dr Nancy De Bremaeker on pharmacovigilance during clinical studies.*

The **Clinical and Epidemiological Investigation Centre** of the **Department of Population Health** invited to its 6<sup>th</sup> Clinical Research Day on 22<sup>nd</sup> October 2014 at Novotel in Kirchberg. More than 100 participants from health care composed the uniquely engaged audience of that year's edition: a compacted training on pharmacovigilance - from clinical development to market introduction.

The Clinical Research Day was initiated six years ago by the head of the Clinical and Epidemiological Investigation Centre and is since then yearly held in October. It is the ideal occasion to highlight the increasing importance of clinical research in Luxembourg and present new developments that impact researchers, clinical investigators and patients.

The 6<sup>th</sup> edition was organised by Dr Anna Chioti, her co-workers, a small scientific committee composed of medical doctors and pharmacists and the 'Centre Régional de Pharmacovigilance de Nancy'. Under the direction of 'Division de la Santé - Division de la Pharmacie et des Médicaments', the organisers established a well-filled program divided into two parts to highlight the subject of pharmacovigilance, which is the monitoring and prevention of adverse events during the testing phases of novel pharmaceutical products and after their market authorisation.

The Clinical Research Day is considered as a **professional training for health care actors**. The morning session, dedicated to pharmacovigilance during clinical trials, was targeted for medical investigators and scientists active in clinical research. The afternoon session about the safe use of drugs following market introduction was particularly intended to general practitioners, specialised physicians, dentists, pharmacists and other health care professionals.





6th Clinical Research Day: Cocktail.

## SCIENTIFIC AND BROAD PUBLIC EVENTS

Once more, CRP-Santé invited the research community to a range of interesting scientific conferences with internationally recognised speakers. The greatest highlight of the year was the co-organisation of a very large medical congress, a unique event carefully prepared over several years. Furthermore, CRP-Santé also organised or participated in various events to promote science and research to the broad public. The following sections bring up some of the most memorable events of the past year.

### LECTURE SERIES WITH INTERNATIONAL SPEAKERS

Two lectures series, jointly organised with the Centre Hospitalier de Luxembourg and supported by the Luxembourg National Research Fund, were held with invited speakers from abroad: one around the subject of oncology, the other one dedicated to the field of infection and immunity. Each lecture was followed by a workshop intended for young researchers to ask more detailed questions about the lecture topic, specific techniques or the professional background of the speakers.

The **Lecture Series in Oncology** comprised eight lectures held between February and December and was attended by a total of 380 people. Big data in cancer research, translational neuro-oncology and cancer epigenetics were some of the captivating topics.

The **Lecture Series in Infection and Immunity** was composed of ten lectures on current research issues such as antiviral drug discovery, diagnosis and treatment of allergies or the function of natural killer cells in immunity. 540 people attended the lectures.

### VISIT OF NOBEL LAUREATE PROF DR FRANÇOISE BARRÉ-SINOUSSE

In the frame of the Lecture Series in Infection and Immunity, Nobel laureate Prof Dr Françoise Barré-Sinoussi was a special invitee to hold a conference on 22<sup>nd</sup> May 2014. Arriving in Luxembourg, she was received by the Prime Minister Mr Xavier Bettel and his excellence Guy Yelda, the Ambassador of France in Luxembourg in the presence of Dr Jean-Claude Schmit, CEO of CRP-Santé.

She is well known for her outstanding work led in the field of retrovirology. In 1983, she discovered the human immunodeficiency virus (HIV) jointly with her advisor Prof Dr Luc Montagnier. Both received the Nobel Prize in Medicine or Physiology in 2008. Prof Dr Barré-Sinoussi is currently director of the unit 'Regulation of Retroviral Infections' at the Pasteur Institute in Paris.



*Press conference with Prof Dr Françoise Barré-Sinoussi.*





Her presentation entitled '**HIV/AIDS: 30 years later, which challenges remain?**' gave a retrospective of the work achieved in the field of HIV research since the early 80's and the questions that still need to be addressed. The lecture gathered 150 attendants at the amphitheatre of the Centre Hospitalier de Luxembourg and was a unique opportunity for CRP-Santé to reinforce links with the Pasteur Institute. The event got support from the Centre Hospitalier, the Luxembourg National Research Fund, the French Institute and the French Embassy.

*Reception of Prof Dr Françoise Barré-Sinoussi by Prime Minister Xavier Bettel (front) and Guy Yelda, Ambassador of France in Luxembourg (back).*



## ANNUAL CONGRESS OF THE FRENCH SOCIETY OF ARTHROSCOPY

For the first time, the annual congress of the French Society of Arthroscopy (SFA) was held outside of the French borders. It took place from 4<sup>th</sup> to 6<sup>th</sup> December 2014 at the exhibition centre Luxexpo in Kirchberg. This congress is the flagship event of the SFA, a scientific society of more than 1000 members passionate of arthroscopy, which is the minimally invasive surgery of human joints susceptible to injury.

Bringing the SFA congress to Luxembourg and setting it up took **eight years of intensive preparation** for its co-organisers, CRP-Santé and Centre Hospitalier de Luxembourg. The congress hosted more than 1,500 participants from research, medicine and health care industry arriving from France, the Greater Region and other parts of Europe. The congress was directed by arthroscopy specialist Prof Dr Romain Seil from CRP-Santé and Centre Hospitalier and co-directed by Prof Dr Henning Madry from the Saarland University Medical Centre.



*SFA congress: Congress president Prof Dr Romain Seil.*

An exceptional scientific programme on meniscal repair and acromioclavicular joint instability was provided. Internationally renowned speakers from more than twenty countries held presentations in five parallel sessions. The congress programme also included instructional courses for physicians, nurses and physiotherapists as well as a big exhibition area for medical industry.

On the last day of the congress, the SFAMovement and CRP-Santé Day, a multidisciplinary session was held by the 'Académie Luxembourgeoise de Médecine, de Kinésithérapie et des Sciences du Sport'. This was also the occasion to celebrate the **5<sup>th</sup> anniversary of the Sports Medicine Research Laboratory** of CRP-Santé and the 10<sup>th</sup> anniversary of the Sports Clinic of the Centre Hospitalier.

Of note, Caroline Mouton, PhD candidate at the Sports Medicine Research Laboratory of the Department of Population Health, was awarded the prize for the **best clinical communication** of the congress by presenting her innovative research on knee laxity, the elasticity of knee ligaments.

The SFA congress was most probably the biggest medical congress ever organised in Luxembourg and thus presents an important economical factor for the country. It was a unique opportunity to promote CRP-Santé internationally and to show Luxembourg's attractiveness, both as medical and life sciences research location and as tourist destination. The congress received exceptional support from Luxembourgish institutions as well as Luxembourgish and foreign companies.



*SFA congress: Award for best clinical communication to PhD candidate Caroline Mouton.*

## WORLD HEALTH DAY 2014: CREATING AWARENESS ON VECTOR-BORNE DISEASES



The World Health Day 2014 on 7<sup>th</sup> April with the slogan 'Small bite, big threat' informed people worldwide about the danger of vector-borne diseases. Vectors are organisms transmitting infectious pathogens from one individual (animal or human) to another. Prominent examples of vector-borne diseases are malaria, yellow fever and chikungunya transmitted by mosquitoes.

On the occasion of the World Health Day, CRP-Santé installed a booth on the Place Guillaume II in the city centre of Luxembourg during the weekly market to inform and create awareness on this important topic. The general public could get useful tips on how to prevent insect bites and thus avoid the transmission of dangerous, sometimes life-threatening, pathogens. They also had the opportunity to look at different mosquito species and ticks under the microscope and could test their knowledge on vector-borne diseases with a quiz.

Besides, the stand informed about some of the activities of the **Department of Immunology** that conducts intensive research on infectious agents. Department head Prof Dr Claude Muller and his group assessed the status of mosquito species in Luxembourg and identified infectious agents in ticks collected in Luxembourg, Eastern Europe and West Africa. Currently, the team is focusing on the complex and not yet fully understood immune response against Lyme Borreliosis, which is the most important tick-borne disease in Europe and also in Luxembourg. Furthermore, it works on the development of a vaccine against ticks, which would allow to reduce tick burden as well as prevent from transmission not only of Lyme Borreliosis but also of all the other diseases that can be transmitted by ticks in Europe.



World Health Day booth at Place Guillaume II.



## RESEARCHERS' DAYS: INTERACTIVE WORKSHOP ON CLINICAL TRIALS

At the past edition of the Researchers' Days, a biennial initiative of the Luxembourg National Research Fund, CRP-Santé was present with a didactic workshop on clinical research. In a playful and interactive way, the public was informed about the purpose of clinical trials, drug safety, ethical aspects and regulations as well as the diversity of careers in clinical research. The workshop was jointly organised by members of the **Clinical and Epidemiological Investigation Centre, Department of Population Health** and the **Laboratory of Cellular and Molecular Oncology**, now **Department of Oncology**.

On the first day, high school classes with pupils aged between 12 and 18 visited the workshop. On the second day, the event was open to the

broad public. Numerous visitors participated in the proposed activities. The organisers had prepared instructive posters and fun-filled pedagogic games to initiate the public to the topic of clinical research. About 200 visitors also participated in a final quiz to test their newly gained knowledge.

The workshop team was composed of people with various professional backgrounds: researchers, medical doctors, study nurses, Clinical Research Associates and laboratory technicians and thus represented well the diversity of job profiles encountered at CRP-Santé. Whenever asked, the facilitators readily told about their passion for research and the day-to-day work at the institute.



Three of the organisers of the clinical research workshop at the Researchers' Days. From left to right: Lionel Keke, Thérèse Bagnah and Gloria Montanes.



## AWARDS AND NOMINATIONS

The past year, several national and international prizes were awarded to honour scientific merit and engagement of CRP-Santé's researchers.



*Prof Dr Rolf Bjerkvig.*

### PROF DR ROLF BJERKVIG: FUNDING FOR A BRAIN TUMOUR RESEARCH CENTRE IN BERGEN

Prof Dr Rolf Bjerkvig, director of CRP-Santé's **Department of Oncology** and professor at the University of Bergen in Norway, was awarded the impressive sum of **two million euros** by the private philanthropic foundation Kristian Gerhard Jebsen to establish a KG Jebsen Brain Tumour Research Centre in Bergen.

At present, 14 different KG Jebsen Centres have been awarded, representing the strongest research environments in Norway. To get the support for such a centre, Prof Bjerkvig's research activities underwent a thorough quality assessment by an international expert group.

The main goal of the new centre, which officially opened on 13<sup>th</sup> June 2014, is to develop novel treatment strategies for malignant brain tumours. It will work in close collaboration with the NorLux Neuro-Oncology Laboratory at CRP-Santé, the Centre Hospitalier de Luxembourg and the Haukeland University Hospital in Bergen.



*Prof Dr Simone Niclou.*

### DR SIMONE NICLOU: APPOINTMENT AS ASSOCIATE PROFESSOR AT THE UNIVERSITY OF BERGEN

On the occasion of the inauguration of the KG Jebsen Brain Tumour Research Centre in Bergen, Dr Simone Niclou, head of the **Norlux Neuro-Oncology Laboratory** at the **Department of Oncology** was nominated as associate professor at the University of Bergen.

The main task of the appointment is to connect and oversee research activities in the NorLux laboratory at CRP-Santé with those of the NorLux laboratory at the University of Bergen, headed by Prof Dr Rolf Bjerkvig. Moreover, Prof Dr Niclou will teach courses on tumour biology for medical students and will be engaged in the supervision of PhD candidates at the University of Bergen.

## DR ANNA CHIOTI: TWO AWARDS FOR MAJOR CONTRIBUTIONS TO CLINICAL RESEARCH

Dr Anna Chioti, head of the **Clinical and Epidemiological Investigation Centre** at the **Department of Population Health**, was awarded twice in 2014. She received the international award 'Advancing Public Awareness in Clinical Research' of the Association of Clinical Research Professionals for her commitment to raising public awareness about clinical trials through trainings, conferences, elaboration of educational material and the LuxClin website dedicated to clinical research ([www.luxclin.lu](http://www.luxclin.lu)).

She and her team also received the award 'Outstanding Contribution to Luxembourg Health Care and Life Sciences Community' during the first Luxembourg Health Care Summit held on 5<sup>th</sup> June 2014 and gathering more than 300 participants.

## ALINE LECOMTE: 'MOST INNOVATIVE ENTITY' AWARD

The 'Most Innovative Entity' prize was awarded to project manager Aline Lecomte and her team at the **Centre for Health Studies** of the **Department of Population Health** during the Luxembourg Health Care Summit 2014. She was honoured for the establishment of a national surveillance system of perinatal health, one of the most effective and innovative in Europe.



*Dr Anna Chioti and Aline Lecomte awarded on the occasion of the Luxembourg Health Care Summit. From left to right: Jérôme Graas, Aurélie Fischer, Dr Nancy De Bremaeker, Dr Anna Chioti, Roxane Batutu, Dr Sophie Couffignal, Aline Lecomte, Jean-Pierre Cornez and Audrey Billy.*

## DR JOANNA BAGINSKA AND DR BASSAM JANJI: FNR AWARD FOR OUTSTANDING SCIENTIFIC PUBLICATION

On 17<sup>th</sup> October 2014, two members from the **Laboratory of Experimental Hemato-Oncology** of the **Department of Oncology**, Dr Joanna Baginska, postdoctoral researcher, and Dr Bassam Janji, senior researcher, were honoured by the Luxembourg National Research Fund with the 'FNR Award for Outstanding Scientific Publication' for their research article (*Baginska et al., 2013*) in the highly acclaimed journal 'Proceedings of the National Academy of Sciences of the United States of America' (impact factor 9.809).

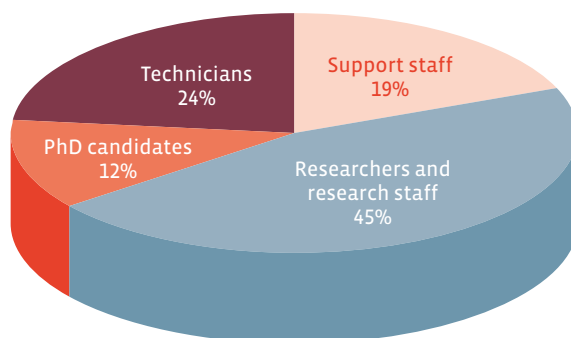
The publication, entitled 'Granzyme B degradation by autophagy decreases tumour cell susceptibility to natural killer-mediated lysis under hypoxia', was selected because it provides a cutting edge advance in the field of cancer immunotherapy.



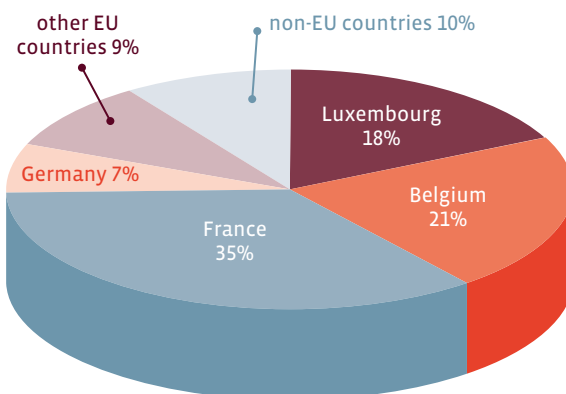
Dr Bassam Janji and Dr Joanna Baginska at the FNR Awards ceremony.

## KEY FIGURES

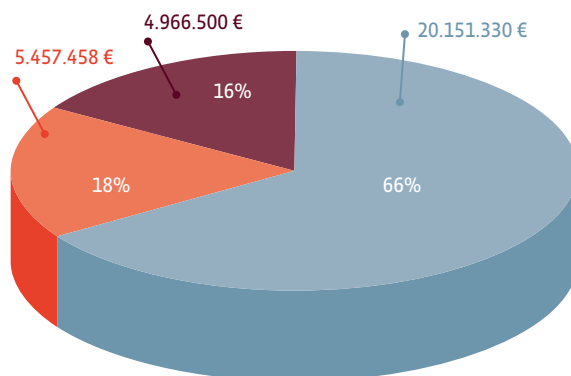
**Staff categories**  
Headcount December 2014 (total: 292).



**Staff nationalities**  
Headcount December 2014 (total: 292).

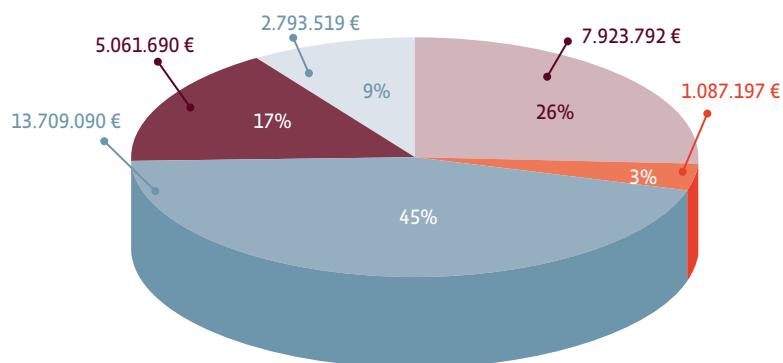


**Sources of funding in 2014**  
(in percentage and euros).



- Ministry of Higher Education and Research
- Competitive Research
- Contractual Research

**Statutory expenses in 2014**  
(in percentage and euros).



- Operating costs
- Amortisation
- Personnel costs - Permanent contracts
- Personnel costs - Fixed-term contracts
- Students



# FINANCIAL REPORT

## PROFIT AND LOSS ACCOUNT from 1<sup>st</sup> JANUARY 2014 to 31<sup>st</sup> DECEMBER 2014

(In euros)

	2014 (01.01.14-31.12.14)	2013 (01.01.13-31.12.13)
<b>A. CHARGES</b>		
1. Use of merchandise, raw materials and consumable materials	2 584 510	2 915 101
2. Other external charges	4 998 456	6 252 056
3. Staff costs	21 564 088	21 088 607
a) Salaries and wages	18 938 981	18 596 435
b) Social security on salaries and wages	2 625 107	2 492 172
4. Value adjustments	1 087 197	1 357 949
a) on formation expenses and on tangible and intangible fixed assets	1 087 197	1 357 949
5. Other operating charges	329 521	413 977
8. Interest and other financial charges	5 413	4 488
b) other interest and similar financial charges	5 413	4 488
9. Extraordinary charges	6 103	1 033 900
11. Other taxes not included in the previous caption	0	353
12. Profit for the financial year	0	0
<b>TOTAL CHARGES</b>	<b>30 575 288</b>	<b>33 066 431</b>
<b>B. INCOME</b>		
1. Net turnover	2 214 301	1 051 546
5. Other operating income	27 997 456	30 649 331
8. Other interest and other financial income	63 164	62 243
a) derived from affiliated undertakings	0	2 354
b) other interest and similar financial income	63 164	59 889
9. Extraordinary income	300 367	1 303 311
<b>TOTAL INCOME</b>	<b>30 575 288</b>	<b>33 066 431</b>

# BALANCE SHEET - 31<sup>st</sup> DECEMBER 2014

(in euros)

ASSETS	31.12.2014	31.12.2013	LIABILITIES	31.12.2014	31.12.2013
<b>C. FIXED ASSETS</b>			<b>A. CAPITAL AND RESERVES</b>		
<b>I. Intangible fixed assets</b>	<b>596 185</b>	<b>276 950</b>	<b>I. Subscribed capital</b>	<b>99 157</b>	<b>99 157</b>
2. Concessions, patents, licences, trade marks and similar rights and assets					
a) acquired for valuable consideration	254 056	195 795	<b>IV. Reserves</b>	<b>1 486 881</b>	<b>1 486 881</b>
4. Payments on account and intangible fixed assets under development	342 129	81 155	4. Other reserves	1 486 881	1 486 881
<b>II. Tangible fixed assets</b>	<b>4 822 876</b>	<b>3 205 796</b>			
3. Other fixtures and fittings, tools and equipment	3 257 231	3 160 986	<b>V. Profit or loss brought forward</b>	<b>955 944</b>	<b>955 944</b>
4. Payments on account and tangible fixed assets under development	1 565 645	44 810			
<b>III. Financial fixed assets</b>	<b>384 008</b>	<b>322 585</b>	<b>VI. Profit or loss for the financial year</b>	<b>0</b>	<b>0</b>
3. Shares in undertakings with which the company is linked by virtue of participating interests	380 653	322 585			
6. Loans and claims held as fixed assets	3 355	0	<b>VIII. Capital investment subsidies</b>	<b>5 799 714</b>	<b>3 805 331</b>
<b>TOTAL FIXED ASSETS</b>	<b>5 803 069</b>	<b>3 805 331</b>	<b>TOTAL CAPITAL AND RESERVES</b>	<b>8 341 696</b>	<b>6 347 313</b>
<b>D. CURRENT ASSETS</b>			<b>C. PROVISIONS</b>		
<b>II. Debtors</b>			<b>3. Other provisions</b>	<b>409 088</b>	<b>570 579</b>
<b>1. Trade receivables</b>	<b>1 097 032</b>	<b>387 654</b>			
a) becoming due and payable within one year	1 097 032	387 654	<b>D. NON SUBORDINATED DEBTS</b>		
<b>3. Amounts owed by undertakings with which the company is linked by virtue of participating interests</b>	<b>0</b>	<b>171 227</b>	<b>4. Trade creditors</b>	<b>1 912 935</b>	<b>1 987 326</b>
a) becoming due and payable within one year	0	171 227	a) becoming due and payable within one year	1 912 935	1 987 326
<b>4. Other receivables</b>	<b>1 863 074</b>	<b>2 702 930</b>	<b>8. Tax and social security debts</b>	<b>705 969</b>	<b>697 235</b>
a) becoming due and payable within one year	1 863 074	2 702 930	a) Tax debts	4 195	0
b) becoming due and payable after more than one year	0	0	b) Social security debts	701 774	697 235
<b>IV. Cash at bank, cash in postal cheque accounts, cheques and cash in hand</b>	<b>19 347 686</b>	<b>17 780 671</b>	<b>9. Other creditors</b>	<b>122 735</b>	<b>95 544</b>
			a) becoming due and payable within one year	122 735	95 544
			b) becoming due and payable after more than one year	0	0
<b>TOTAL CURRENT ASSETS</b>	<b>22 307 792</b>	<b>21 042 482</b>	<b>TOTAL PROVISIONS AND NON SUBORDINATED DEBTS</b>	<b>3 150 727</b>	<b>3 350 684</b>
<b>E. PREPAYMENTS</b>	<b>427 998</b>	<b>226 130</b>	<b>E. DEFERRED INCOME</b>	<b>17 046 436</b>	<b>15 375 946</b>
<b>TOTAL ASSETS</b>	<b>28 538 859</b>	<b>25 073 943</b>	<b>TOTAL LIABILITIES</b>	<b>28 538 859</b>	<b>25 073 943</b>

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